

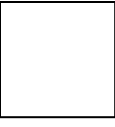





3.7 Factoring Using Algebra Tiles

Representing algebraic expressions with algebra tiles

	represents 1		represents x		represents x^2
	represents -1		represents $-x$		represents $-x^2$

Multiplying binomials using algebra tiles

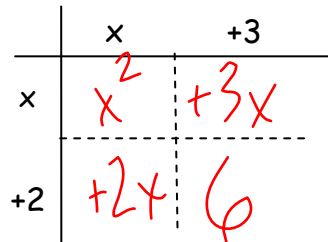
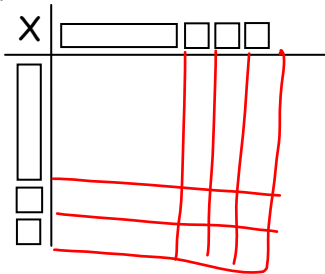
1) Multiply the following binomials using *algebra tiles*, the diagram et then algebraically

Algebra tiles

Diagram

Algebraically

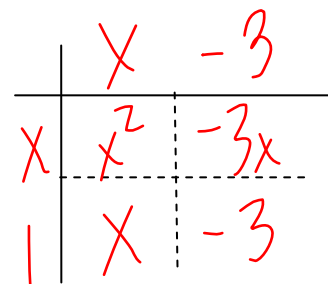
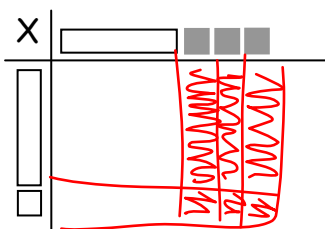
a)



$$= x^2 + 3x + 2x + 6$$

$$= x^2 + 5x + 6$$

b)

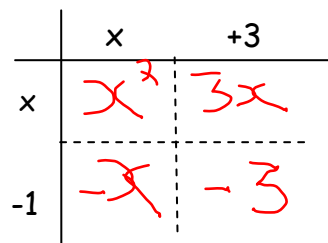


$$= (x-3)(x+1)$$

$$= x^2 + x - 3x - 3$$

$$= x^2 - 2x - 3$$

c)



$$= (x+3)(x-1)$$

$$= x^2 - x + 3x - 3$$

$$= x^2 + 2x - 3$$

Handwritten signature

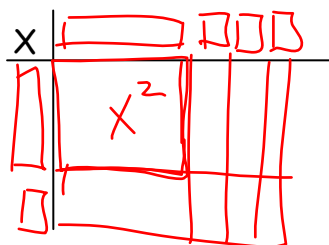
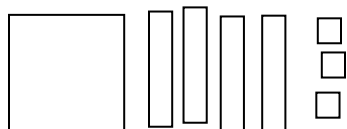
Factoring or creating rectangles

Rules of the game:

The large squares (x^2) cannot touch the small squares (1)The tiles in each *quadrant* must all be the same colour

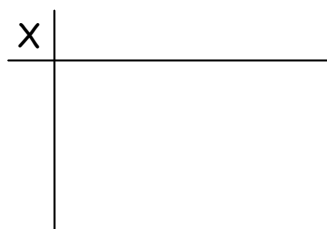
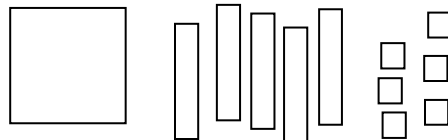
2) Create a rectangle using the following algebra tiles

a)



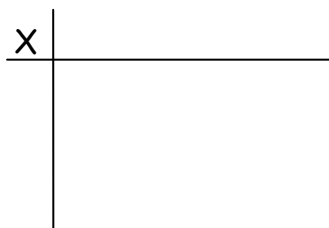
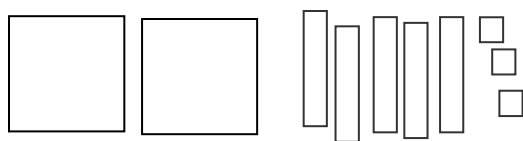
$$(x+3)(x+1) = x^2 + 4x + 3$$

b)



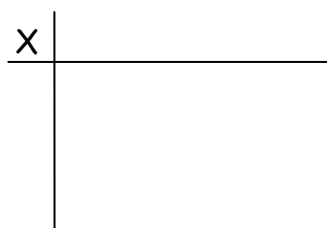
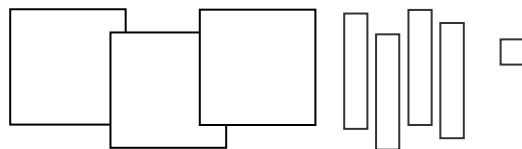
$$(x+3)(x+2) = x^2 + 5x + 6$$

c)



$$(2x+3)(x+1) = 2x^2 + 5x + 3$$

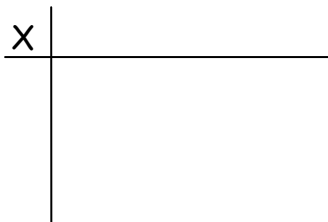
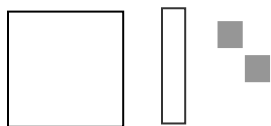
d)



$$(3x+1)(x+1) = 3x^2 + 4x + 1$$

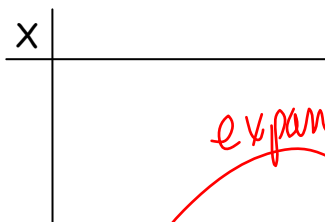
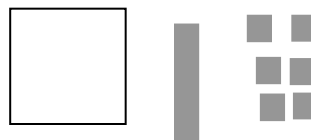
3) Create a rectangle using the following *algebra tiles*

a)



$$(x-1)(x+2) = x^2 + x - 2$$

b)

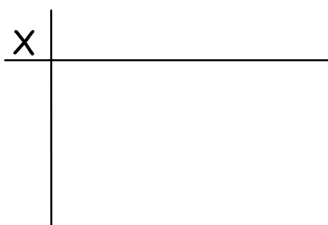
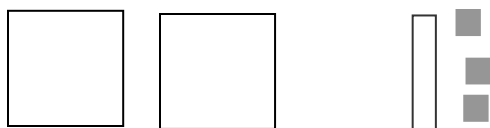


$$(x-3)(x+2) = x^2 - x - 6$$

expanding

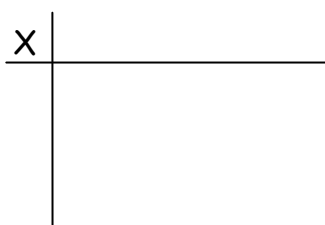
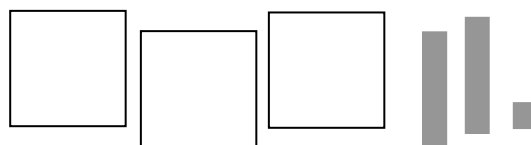
factoring

c)



$$\underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

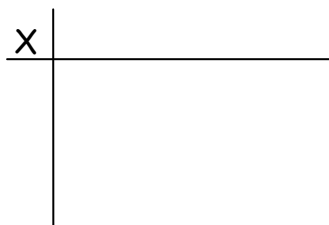
d)



$$\underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

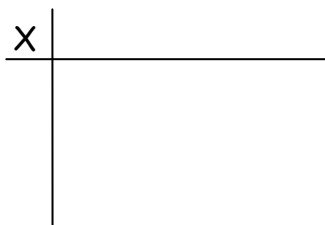
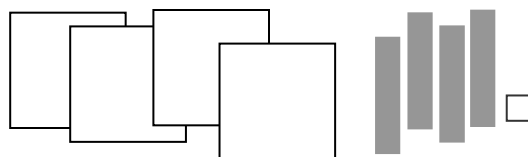
4) Create a rectangle using the following *algebra tile*

a)



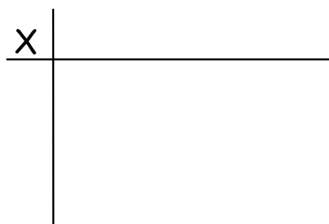
_____ = _____

b)



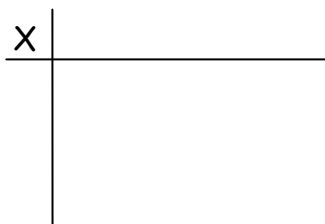
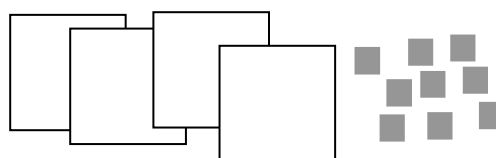
_____ = _____

c)



_____ = _____

d)



_____ = _____

Factoring Simple Trinomials Algebraically

Consider: $(x + 2)(x + 3) = x^2 + 5x + 6$

$$ax^2 + bx + c$$

What relationship is there between the factors and the coefficients of the answer?

Think of it this way... What is the relationship between c and b in standard form.

Think $\begin{matrix} - & - & - \\ + & - & - \\ - & + & - \end{matrix}$

Ex.1 Factor

(a) $x^2 + 4x + 3$

$$= (x + 3)(x + 1)$$

$$\begin{array}{c} \text{M} \\ \hline 3 \end{array} \quad \begin{array}{c} \text{A} \\ \hline 4 \end{array} \quad \begin{array}{c} \text{N} \\ \hline 1 \quad 3 \end{array}$$

(b) $x^2 - 8x + 12$

$$(x - 6)(x - 2)$$

$$\begin{array}{c} \text{M} \\ \hline 12 \end{array} \quad \begin{array}{c} \text{A} \\ \hline -8 \end{array} \quad \begin{array}{c} \text{N} \\ \hline -6 \quad -2 \end{array}$$

5) Factor the following expressions and verify your answer by multiplying the binomials.

a) $x^2 + 3x + 2$

$$\begin{array}{r} (x+1)(x+2) \\ \hline x^2 + 3x + 2 \end{array}$$

$x+1=0$
 $x=-1$

b) $x^2 + 4x - 12$

$$(x+6)(x-2)$$

c) $x^2 + 4x + 3$

$$(x+1)(x+3)$$

d) $x^2 - 3x - 10$

$$(x+2)(x-5)$$

e) $x^2 + 7x + 12$

$$(x+3)(x+4)$$

f) $x^2 - 7x - 8$

$$(x-8)(x+1)$$

g) $x^2 + 8x + 16$

h) $x^2 - 4x + 4$

i) $9x^2 + 12x + 4$

j) $x^2 - 16$

k) $4x^2 - 25$

l) $49x^2 - 81$

m) $2x^2 + 3x + 1$

n) $6x^2 - 5x - 4$

o) $6x^2 + 7x + 2$

p) $3x^2 + 7x + 2$

$$(x+2)(3x+1)$$

q) $2x^2 + 3x - 14$

$$(2x+7)(x-2)$$

r) $2x^2 + 7x + 6$